Having thus described the preferred embodiments, the invention is now claimed to be:

1. A radiation detecting apparatus comprising:

an array **(18)** of elements for converting individual received radiation events into corresponding radiation event signals, one of the radiation converting elements being defective;

a means **(42)** for digitizing the radiation event signals from at least non-defective elements; and

a means **(48)** for generating radiation event signals for the defective radiation converting element based on the radiation event signals from other radiation converting elements of the array.

2. The apparatus as set forth in claim 1 wherein the radiation converting elements each include one of:

solid state detector elements, and

a scintillation crystal and photodiode pair.

3. The apparatus as set forth in claim 1 further including:

a means **(46)** for assigning at least two of the individual radiation converting elements of the array as contributing pixels whose output signals are supplied to the defective pixel output signal generating means **(48)**.

4. The apparatus as set forth in claim 3 wherein the defective pixel output signal generating means **(48)** includes:

a table **(54)** having a position for each of the contributing pixels;

a means **(58)** for passing a token **(56)** among the table positions;

a means **(52)** for receiving the radiation event signals from the contributing radiation converting elements and accessing the table **(54)** to determine whether the corresponding table position holds the token, in response to the corresponding table position holding the token, generating a radiation event signal for the defective radiation converting element and causing the token passing means **(58)** to pass the token.

5. The apparatus as set forth in claim 4, wherein two adjacent radiation converting elements are defective and further including:

two tokens (56), one corresponding to each of the defective radiation event converting element (P0) which the token passing means (58) passes among the table positions.

6. The apparatus as set forth in claim 3, wherein the defective pixel output signal generating means (48) generates output signals for the defective radiation event converting element as a random fraction of events at the contributing radiation event converting elements.

7. The apparatus as set forth in claim 1, further including:

a means (60) for assigning a radiation energy value to the generated radiation event signals for the defective pixel.

8. The apparatus as set forth in claim 7, further including:

a means (62) for varying the energy output of the energy output means (60) over a preselected limited range.

9. The apparatus as set forth in claim 8, wherein the energy varying means includes:

a means (70) for removing a preselected number of least significant bits of the energy value;

a random number generator (72) for randomly generating least significant bits;

a means (74) for replacing the removed least significant bits with the randomly generated least significant bits.

10. The apparatus as set forth in claim 1, further including:

a means (28) for reconstructing radiation event information into an image representation;

a means (30) for storing the image representation;

a means (34) for converting at least a portion of the image representation into a human readable display.

11. A gamma camera comprising:

a two-dimensional array (18) of radiation detector elements which receive incident gamma radiation events and produce corresponding output signals, one of the radiation detector elements (P0) being defective;

at least one analog-to-digital converter **(42)** for converting the element output signals into a digital value indicative of spatial location on the array and energy of the incident gamma radiation event; and

a virtual event generator **(48)** which generates digital output signals for the defective radiation detecting element **(P0)** based on the output signals from other contributing radiation detecting elements **(P1-P8)** of the array.

12. A method of detecting radiation comprising:

receiving radiation events at an array of pixilated locations and generating corresponding radiation event signals, at least one of the locations being defective;

digitizing the radiation event signals from the non-defective locations;

generating radiation event signals for the defective detection location based on the radiation event signals from non-defective locations.

13. The method as set forth in claim 12, further including:

irradiating the pixilated locations with a flood field of gamma radiation;

monitoring at least one of the radiation event signals to determine the defective locations.

14. The method as set forth in claim 13, further including:

assigning locations adjacent each defective location as contributing pixel locations whose outputs form the basis of the generating of the radiation event signal for the defective location.

15. The method as set forth in claim 14, further including:

awarding a token to at least one of the contributing pixel locations;

in response to receiving a radiation event signal corresponding to a contributing pixel location with the token, generating a radiation event signal for the defective pixel location and transferring the token to another contributing pixel location.

16. The method as set forth in claim 15, wherein two adjacent pixel locations are defective, the token awarding step further including:

awarding two tokens, one token corresponding to each defective pixel locations, which tokens are passed independently.

17. The method as set forth in claim 15, wherein the contributing pixels are nearest

neighbors and next nearest neighbor pixel locations and wherein the token passing step includes:

passing the token among the nearest neighbor pixel locations with a higher frequency than passing the token among the next nearest neighbor pixel locations.

18. The method as set forth in claim 12, wherein the radiation event signals are indicative of location and an energy of the received radiation event and further including:

randomly varying digital energy values corresponding to the defective pixel locations.

19. The method as set forth in claim 18, further including:

removing least significant bits of the digital energy value of the radiation event at the contributing pixel location; and,

assigning randomly generated values as the least significant bits.

20. The method as set forth in claim 12 wherein the digitized event signal includes array position values indicative of the location in the array that the radiation event was received, and further including:

reconstructing the digital position values into a three-dimensional image representation; and

converting portions of the image representation into a human readable display.